WHAT IS CLAIMED IS:

1. A liquid crystal apparatus having a liquid crystal layer and a pair of electrodes disposed on both sides of the liquid crystal layer for applying voltage on a liquid crystal enclosed between a pair of substrates, wherein:

the liquid crystal layer comprises a section formed by polymerizing a polymerizable compound in the presence of the liquid crystal by selectively irradiating active energy rays onto the substrate surface when no voltage is applied.

2. A liquid crystal apparatus according to claim 1, wherein said liquid crystal layer comprises a section polymerized by irradiating active energy rays onto the entire surface of the substrate in a voltage applied status after active energy rays are selectively irradiated.

3. A liquid crystal apparatus according to claim 2, wherein at least one of said two active energy ray irradiations is from the direction tilted from the normal line direction of the substrate face.

4. A liquid crystal apparatus according to claim 1, wherein said liquid crystal layer presents a light shielding pattern based on a specific liquid crystal alignment when voltage is applied after said active energy rays are irradiated.

5. A liquid crystal apparatus according to claim 4, wherein said light shielding pattern by a specific liquid crystal alignment includes a lattice pattern or a pattern which is comprised of a cross-shaped main region and branch regions which linearly extend in the peripheral directions.

6. A liquid crystal apparatus according to claim 1, wherein said liquid crystal has a negative dielectric constant anisotropy, and aligns in the vertical direction from the substrate face when no voltage is applied after said active energy rays are irradiated.

7. A liquid crystal apparatus according to claim 1, wherein:

first and second polarizing elements are disposed on both sides of said pair of substrates such that the absorption axes thereof are perpendicular to each other;

a first 1/4 wavelength plate is disposed between one of the substrates and the first polarizing element;

a second 1/4 wavelength plate is disposed between the other substrate and the second polarizing element; and

the absorption axis of the first polarizing element and the slow axis of the first 1/4 wavelength plate form a 45 angle, the absorption axis of the second polarizing element and the slow axis of the second 1/4 wavelength plate form a 45 angle, and the slow axes of the first 1/4 wavelength

plate and the second 1/4 wavelength plate are perpendicular to each other.

8. A manufacturing method of a liquid crystal display apparatus having a liquid crystal layer and a pair of electrodes on both sides of the liquid crystal layer for applying voltage on a liquid crystal disposed between a pair of substrates, wherein the liquid crystal layer is formed from a liquid crystal composition comprising the liquid crystal and a polymerizable compound, a part of the polymerizable compound is polymerized by selectively irradiating active energy rays onto the substrate face when no voltage is applied, then the rest of the polymerizable compound is polymerized by irradiating active energy rays onto the entire face of the substrate in a voltage applied status.

9. A manufacturing method of a liquid crystal display apparatus according to claim 8, wherein a photomask is used for said selective irradiation of active energy rays.

10. A manufacturing method of a liquid crystal display apparatus according to claim 9, wherein the width of the light shielding section and the width of the opening section of said photomask are in a 2-100 μm range, respectively.

11. A manufacturing method of a liquid crystal display

apparatus according to claim 9, wherein said active energy rays are UV rays.

12. A manufacturing method of a liquid crystal display apparatus according to claim 8, wherein said energy active ray irradiation is performed such that said liquid crystal layer presents a light shielding pattern based on a specific liquid crystal alignment when voltage is applied after said active energy rays are irradiated.

13. A manufacturing method of a liquid crystal display apparatus according to claim 8, wherein at least one of said two active energy ray irradiations is performed from the direction tilted from the normal line direction of the substrate face.

14. A liquid crystal display apparatus comprising a first and second substrates which are disposed facing each other, a liquid crystal sealed between said first and second substrates, a first electrode formed on the liquid crystal side surface of the first substrate, a second electrode formed on the liquid crystal side surface of the second substrate, alignment control layers which cover the surfaces of said first and second electrodes and control the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, and bumps which are formed on at least one surface of said first

and second substrates and determine the tilting directions of the liquid crystal molecules when voltage is applied, wherein both of said alignment control layers and said bumps are formed by polymerizing a polymerizable compound which is added to said liquid crystal, and the alignment direction of the liquid crystal molecules near the bumps when no voltage is applied is roughly vertical from the substrate face.

15. A liquid crystal display apparatus according to claim 14, wherein both of said first and second substrates and both of said first and second electrodes are transparent.

16. A liquid crystal display apparatus according to claim 14, wherein at least part of said bumps contacts said first and second substrates.

17. A manufacturing method of a liquid crystal display apparatus, comprising sealing a liquid crystal to which a polymerizable compound is added, between a first and second substrates, polymerizing said polymerizable compound in the liquid crystal, forming alignment control layers for controlling the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, on the surfaces of the first and second substrates, and forming bumps protruding to the liquid crystal side.

18. A manufacturing method of a liquid crystal display apparatus according to claim 17, wherein said polymerizable compound is polymerized by light.

19. A manufacturing method of a liquid crystal display apparatus according to claim 18, wherein light irradiation at a higher energy density is performed on bump formation areas than the other areas for forming said bumps after sealing said liquid crystal in the space between said first and second substrates.

20. A manufacturing method of a liquid crystal display apparatus according to claim 17, wherein said liquid crystal is sealed between said first and second substrates after a treatment is performed to make the surface energy of bump formation areas of at least one of said first and second substrates higher than the other areas.

21. A manufacturing method of a liquid crystal display apparatus according to claim 17, wherein spacers are selectively disposed at the bump formation areas between said first and second substrates, and said bumps are formed using said spacers as cores.

22. A manufacturing method of a liquid crystal display apparatus according to claim 17, wherein at least part of said bumps are allowed to grow from one of said first and

second substrates to contact the other substrate.

23. A liquid crystal display apparatus comprising a first and second substrates which are disposed facing each other, a liquid crystal sealed between said first and second substrates, tilt control sections which are disposed on at least one of said first and second substrates and determine the tilting directions of the liquid crystal molecules when voltage is applied, and alignment control layers which are formed on the liquid crystal side faces of the first and second substrates and control the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, wherein said alignment control layers are formed by polymerizing a polymerizable compound which is added to said liquid crystal.

24. A liquid crystal display apparatus according to claim 23, wherein said tilt control sections are bumps or dents installed on at least one of said first and second substrates.

25. A liquid crystal display apparatus according to claim 23, wherein said tilt control sections are sections formed by a rubbing treatment on the bases of the alignment control layers.

26. A liquid crystal display apparatus according to

claim 23, wherein said tilt control sections are formed by changing the surface energy of said bases of the alignment control layers.

27. A manufacturing method of a liquid crystal display apparatus, comprising forming bumps or dents on at least one of the first and second substrates, disposing the first and second substrates facing each other with the faces where the bumps or dents are formed to be inside, sealing a polymerizable compound-added liquid crystal between said substrates, and polymerizing said polymerizable compound in the liquid crystal and forming alignment control layers, for controlling the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, on the first and second substrates and on the surface of the bumps or dents.

28. A manufacturing method of a liquid crystal display apparatus, comprising performing a rubbing treatment on a first and second substrates, disposing said first and second substrates facing each other with the face where said rubbing treatment is performed to be inside, sealing a polymerizable compound-added liquid crystal between said substrates, and polymerizing said polymerizable compound in the liquid crystal and forming alignment control layers, for controlling the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the

substrate face, on the first and second substrates.

29. A manufacturing method of a liquid crystal display apparatus, comprising partially changing the surface energy of the surface of a first and second substrates, sealing a polymerizable compound-added liquid crystal between said first and second substrates, and polymerizing said polymerizable compound in the liquid crystal and forming alignment control layers, for controlling the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, on the first and second substrates.

30. A manufacturing method of a liquid crystal display apparatus according to claim 29, wherein light is selectively irradiated on said substrate surface via a mask in said partial changing of the surface energy of the substrate surface.

31. A manufacturing method of a liquid crystal display apparatus, comprising disposing a pair of substrates, on which surface alignment control films are formed, facing each other with the alignment control films to be inside, sealing a liquid crystal to which a polymerizable compound is added, between these substrates, polymerizing said polymerizable compound by irradiating UV rays when no voltage is applied, and forming a polymer network near the surfaces of said

alignment control films, wherein the anchoring energy for the liquid crystal molecules on the substrate surface is controlled by controlling the composition, the adding amount and the polymerizing conditions of the polymerizable compound.

32. A manufacturing method of a liquid crystal display apparatus according to claim 31, wherein said anchoring energy is controlled on each pixel.

33. A manufacturing method of a liquid crystal display apparatus according to claim 31, wherein a plurality of areas having different anchoring energies are formed in a pixel.

34. A liquid crystal display apparatus according to claim 1, the apparatus comprising a first and second substrates which are disposed facing each other, a liquid crystal sealed between said first and second substrates, a first electrode formed on the liquid crystal side surface of the first substrate, a second electrode formed on the liquid crystal side surface of the second substrate, alignment control layers which cover the surfaces of said first and second electrodes and control the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, and bumps which are formed on at least one surface of said first and second substrates and determine the tilting directions of the liquid crystal molecules when voltage is applied, wherein both of

said alignment control layers and said bumps are formed by polymerizing a polymerizable compound which is added to said liquid crystal, and the alignment direction of the liquid crystal molecules near the bumps when no voltage is applied is roughly vertical from the substrate face.

35. A manufacturing method of a liquid crystal display apparatus according to claim 7, the method comprising sealing a liquid crystal to which a polymerizable compound is added, between a first and second substrates, polymerizing said polymerizable compound in the liquid crystal, forming alignment control layers for controlling the alignment direction of the liquid crystal molecules when no voltage is applied to be roughly vertical from the substrate face, on the surfaces of the first and second substrates, and forming bumps protruding to the liquid crystal side.

36. A liquid crystal display apparatus according to claim 1, the apparatus comprising a first and second substrates which are disposed facing each other, a liquid crystal sealed between said first and second substrates, tilt control sections which are disposed on at least one of said first and second substrates and determine the tilting directions of the liquid crystal molecules when voltage is applied, and alignment control layers which are formed on the liquid crystal side faces of the first and second substrates and control the alignment direction of the liquid crystal

molecules when no voltage is applied to be roughly vertical from the substrate face, wherein said alignment control layers are formed by polymerizing a polymerizable compound which is added to said liquid crystal.

37. A manufacturing method of a liquid crystal display apparatus according to claim 7, the method comprising disposing a pair of substrates, on which surface alignment control films are formed, facing each other with the alignment control films to be inside, sealing a liquid crystal to which a polymerizable compound is added, between these substrates, polymerizing said polymerizable compound by irradiating UV rays when no voltage is applied, and forming a polymer network near the surface of said alignment control films, wherein the anchoring energy for the liquid crystal molecules on the substrate surface is controlled by controlling the composition, the adding amount and the polymerizing conditions of the polymerizable compound.

38. A liquid crystal display apparatus wherein a first substrate on which surface first electrodes with a vertical alignment control film are formed and a second substrate on which surface a second electrode with a horizontal alignment control film is formed face each other at the alignment control film side, the facing substrates are sealed with a space in between, a liquid crystal comprising a functional monomer is sealed in said space, and a plurality of roughly

rectangular pixel electrodes made of the first electrodes are arrayed on the first substrate, for performing the alignment control of said liquid crystal by irradiating light from a direction tilted from the normal line direction on said liquid crystal display apparatus to polymerize said monomer,

wherein said first substrate has a structure for controlling the alignment of the liquid crystal molecules in said liquid crystal when voltage is applied between said pixel electrodes and said second electrode.

39. A liquid crystal display apparatus according to claim 38, wherein said structure is a fine ITO pattern formed in said pixel electrodes.

40. A liquid crystal display apparatus according to claim 38, wherein said structure is an insulating pattern formed on said pixel electrodes.

41. A liquid crystal display apparatus according to claim 38, wherein said functional monomer has two or more functional groups.

42. A liquid crystal display apparatus according to claim 38, wherein UV rays are used for said light irradiation.

43. A liquid crystal display apparatus according to claim 38, wherein said functional monomer is an acrylate.

44. A liquid crystal display apparatus according to claim 38, wherein said functional monomer is a methacrylate.

45. A liquid crystal display apparatus according to claim 38, wherein said light irradiation is performed by irradiating with light from a first direction, which is tilted from the normal line direction on said liquid crystal display apparatus face, onto partial areas of said pixel electrode faces, and by irradiating with light again from a second direction, which is different from the first direction, onto the entire areas of the pixel electrode faces, for each one of the pixel electrodes.

46. A liquid crystal display apparatus according to claim 38, wherein said liquid crystal is of a negative type.

47. A liquid crystal display apparatus according to claim 38, wherein said liquid crystal is of a positive type.

48. A liquid crystal display apparatus according to claim 38, wherein said liquid crystal is in a normally black mode, and the alignment of the liquid crystal molecules is controlled so as to switch to the direction of the light irradiation by applying voltage.

49. A liquid crystal display apparatus according to

claim 1, wherein a first substrate on which surface first electrodes with a vertical alignment control film are formed and a second substrate on which surface a second electrode with a horizontal alignment control film is formed face each other at the alignment control film side, the facing substrates are sealed with a space in between, a liquid crystal comprising a functional monomer is sealed in this space, and a plurality of roughly rectangular pixel electrodes made of the first electrodes are arrayed on the first substrate, for performing the alignment control of the liquid crystal by irradiating light from a direction tilted from the normal line direction on the liquid crystal display apparatus to polymerize the monomer, wherein the first substrate has a structure for regulating the alignment of the liquid crystal molecules in the liquid crystal when voltage is applied between the pixel electrodes and the second electrode.

50. A liquid crystal display apparatus according to claim 49, wherein said light irradiation is performed by irradiating with light from a first direction, which is tilted from the normal line direction on said liquid crystal display apparatus face, onto partial areas of said pixel electrode faces, and by irradiating with light again from a second direction, which is different from the first direction, onto the entire areas of the pixel electrode faces, for each one of the pixel electrodes.